

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**

End Semester Examination, December 2017

Program: M. Tech- HSE and HSE+DM

Semester – III

Subject (Course): Safety in Engineering Industry

Max. Marks : 100

Course Code : MEEG 847

Duration : 3 Hrs

No. of page/s: 1

**Answer all the questions:****5 \* 4 = 20 Marks**

1. List out various metal forming processes in metal forging.
2. Name all the hazardous energies to be safeguarded to prevent injuries/fatalities during any service/maintenance activity and mention the national/international code reference. [3 + 1]
3. Postulate any four hazards to be considered for appropriate designing of machine guarding.
4. List any four physiological risks associated with Manual Material Handling. [4]
5. Enlist and brief various types of industrial cranes along with their applications. [2+2]

**Answer all the questions:****4 \* 10 = 40 Marks**

6. Define “Occupational Health Hazard”. Discuss common health hazards of heavy engineering industries. [2 + 8]
7. Discuss all the OS&H hazards in metal and wood machining workshops [5+5]
8. Give the detailed classification of Engineering sector in India as per ICS [10]
9. Explain specific health & safety hazards pertaining to arc welding process. [5 + 5]

**Answer the following:****2 \* 20 = 40 Marks**

10. Discuss in detail about the health & safety hazards of the most common industrial gas welding/cutting processes and preventive and mitigation measures to be followed to avoid accidents/incidents. [10 + 10]
11. Discuss various safety concerns in case of forklifts and based on the same develop a checklist to be used by supervisor to ensure safe flow of materials [ 2 + 8 + 10]

(OR)

12. Mr. A and three other workers were using a chain sling to remove an elbow pipe from a suction pipeline in a pump room. When the overhead lifting crane raised the elbow pipe, the lifting lug that was welded to the elbow pipe gave way and struck him, causing him to fall off the pipeline he was sitting on. He (Mr. A) fell onto the unguarded platform and the impact caused him to roll over and fall again, hitting another pipeline before eventually landing on the floor of the pump room caused instantaneous death to him. Investigation team gave recommendations to provide training to the workers (hazard identification and awareness), use proper welding practices, proper usage of safety belts and adequate surveillance for such lifting operations.
  - i. List and explain all the machine, human (employer as well employee) and work place environment related errors in this incident. [4 + 8]
  - ii. What pre-checks could have avoided such occurrences in lifting operations? [8]



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**Answer all the questions:**

**5 \* 4 = 20 Marks**

1. List out various metal forming processes in metal casting.
2. Name all the hazardous energies to be safeguarded to prevent injuries/fatalities during any service/maintenance activity and mention the national/international code reference. [3 + 1]
3. Name any four common hazards associated with material handling operations in engineering sectorial industries. [4]
4. Define “LTI” as per IS 3786. Give the formulae for “LTIFR” and incident rates. [2+2]
5. Define and brief about ZMS and it’s significance. [1+3]

**Answer all the questions:**

**4 \* 10 = 40 Marks**

6. Define “Occupational Health Hazard”. Discuss common health hazards of heavy engineering industries. [2 +8]
7. List and explain the health and safety concerns of metal forging operations. [4+6]
8. Give the detailed classification of Engineering sector in India as per ICS [10]
9. Explain various kinds of preventive/protective measures to be taken to avoid occupational illness in casting processes. [5 +5]

**Answer the following:**

**2 \* 20 = 40 Marks**

10. Discuss in detail about the health & safety hazards of the most common industrial gas welding/cutting processes and preventive and mitigative measures to be followed to avoid accidents/incidents. [10 + 10]
11. Define ‘Rigging’. Discuss how the SWL of a lifting operation depends on ‘Safe Rigging’. Explain the prechecks/inspections required for safe lifting operation. [2 + 8 + 10]

(OR)

12. Mr. A and three other workers were using a chain sling to remove an elbow pipe from a suction pipeline in a pump room. When the overhead lifting crane raised the elbow pipe, the lifting lug that was welded to the elbow pipe gave way and struck him, causing him to fall off the pipeline he was sitting on. He (Mr. A) fell onto the unguarded platform and the impact caused him to roll over and fall again, hitting another pipeline before eventually landing on the floor of the pump room caused instantaneous death to him. Investigation team gave recommendations to provide training to the workers (hazard identification and awareness), use proper welding practices, proper usage of safety belts and adequate surveillance for such lifting operations.
  - i. List and explain all the machine, human (employer as well employee) and work place environment related errors in this incident. [4 + 8]
  - ii. What pre-checks could have avoided such occurrences in lifting operations? [8]